

Docket No.: 043888-0411

**PATENT**

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Application of : Customer Number: 53080  
Akiko FUJINO, et al. : Confirmation Number: 4156  
Application No.: 10/555,447 : Group Art Unit: 1795  
Filed: November 03, 2005 : Examiner: Wang, Eugenia  
For: LITHIUM SECONDARY BATTERY

**REPLY BRIEF**

Mail Stop Reply Brief  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

Pursuant to 37 C.F.R. § 41.41, the following Remarks are respectfully submitted in response to the Examiner's Answer dated August 1, 2008. Appellants reassert all arguments contained in the Principal Brief.

**Status of Claims**

1. Claims canceled: None
2. Claims withdrawn from consideration, but not canceled: None
3. Claims pending: 1-8
4. Claims allowed: None
5. Claims rejected: 1-8
6. Claims on appeal: 1-8

**Grounds of Rejection To Be Reviewed By Appeal**

- (1) Claims 1, 2 and 5-8 stand rejected under 35 U.S.C. § 103(a) for obviousness predicated upon Yamashita et al. (USP No. 6,287,720) (“Yamashita”) in view of Fujiwara et al. (USP No. 6,576,366) (“Fujiwara”).
- (2) Claims 3 and 4 stand rejected under 35 U.S.C. § 103(a) for obviousness predicated upon Yamashita et al. and Fujiwara et al. in view of Shi et al. (US 2005/0014063).

**Argument**

**Claims 1, 2 and 5-8 are not obvious under 35 U.S.C. § 103(a) over Yamashita in view of Fujiwara.**

Claims 1, 2 and 5-8 stand rejected under 35 U.S.C. § 103(a) over Yamashita in view of Fujiwara. Appellant respectfully replies to the Examiner's Answer as follows.

**Issue 1(a) - Polyethylene and non-woven cloth are not equivalents for the separator of the present disclosure**

In the Response to Arguments portion of the Examiner's Answer, in Issue 1(a), the Examiner disagrees with Appellent's argument that polyethylene and non-woven cloth are not equivalents in the art. The Examiner cites the Background section of the present application that both polyolefin microporous films and non-woven cloths have been used as separators. In addition, the Examiner alleges that Yamashita teaches known materials used for separators include olefin polymers, such as polyethylene and non-woven cloth. As such, the Examiner concludes that replacing a microporous film with a non-woven cloth would be obvious to one of ordinary skill in the art.

In response, Applicants note that there indeed have been proposals to use non-woven cloths for lithium secondary batteries. However, one skilled in the art would find such a proposal unreasonable. This is because non-woven cloths are often used for alkaline storage batteries, but cannot be suitably used for general lithium secondary batteries. Appellants have demonstrated this deficiency in Tables 1 and 2 the present disclosure, in which a battery having only a non-woven cloth has a defective rate of 18%. In contrast, batteries having only PE film (comparative Example 2) showed 0% defective rate. As such, non-woven cloth and PE microporous film are not equivalents.

**Issue 1(b) - The combination of porous film and non-woven cloth does exhibit unexpected results.**

In Issue 1(b), the Examiner makes several arguments, set forth as follows:

- a) the difference of discharged capacities between Comparative Examples and Examples is 100 mAh at maximum, which is not construed as a significant difference in view of the design capacity of about 2000 mAh;
- b) the design of the battery in Examples is different from that of comparative examples, which makes side-by-side comparison impossible;
- c) the discharge capacities in Examples 16 and 17 are lower than that of Comparative Example 4;
- d) the difference in capacity retention rate between Examples and Comparative Examples is not seen as significant, and further in view of Nakamizo, is not regarded as unexpected;
- e) the nail penetration safety in Example 2 (porous film thickness is 0.3 µm) is inferior to that in Comparative Example 4; and
- f) there are examples showing the use of a polyethylene microporous film separator (Comparative Example 4) and a polypropylene non-woven cloth separator and a polypropylene/polyamide separator (Examples), but there is no example showing the use of a polyethylene non-woven cloth separator, which fails to clearly show whether the material itself brings about the differences in characteristics or the material type brings about the differences in characteristics.

In response, Applicants note that examples including a non-woven cloth and a porous film yielded a far better discharge capacity than Comparative Example 4 including a

microporous film and a porous film, and provided a remedy to the defect of a defective ratio of 18% and an improvement in safety. Therefore, an unexpected result has indeed been shown.

Furthermore, with regard to statements a) through e), Appellant would point out that with at least regard to claim 5, the thickness of the porous film is 0.5 µm or more and as such, Example 2 is not applicable to that claim. Moreover, the result of the nail penetration safety test is the most important of the evaluation results, because batteries with slightly low discharge capacities or slightly low capacity retention rates are applicable for practical use, but those with low nail penetration safety are not. Thus, the batteries should be compared comprehensively, incorporating all the characteristics including nail penetration safety, and as such, the comparisons of individual characteristics are not as important. Accordingly, Appellants note that, taken as a whole, the characteristics of the batteries of the claimed subject matter show unexpectedly superior results over the comparative examples, despite whether one individual characteristic may show results that are not as favorable as those one or two comparative examples.

With regard to f), the use of a polyethylene non-woven cloth in place of the polypropylene non-woven cloth provides the same effect. The structure of non-woven cloth, as discussed in paragraph [0016] of the present specification, contributes to provide a good nail penetration result. Non-woven cloths are less likely to deform as compared with microporous films (see, for example, paragraph [0105] of the present specification). Moreover, the discharge characteristics and the capacity retention rate are dependent on the electrolyte retaining ability of the separator. A good electrolyte retaining ability is derived from the structure of non-woven cloth.

**Issues 1(c) - 1(e) - Applicants Admitted Prior Art does not support the Examiner's Arguments of Obviousness**

The Examiner has cited the Background section of the present specification on several occasions in order to support the argument that a) because two different separator materials have different advantages and disadvantages does not undermine the fact that they are both recognized as known separator materials, thus making them art recognized equivalents; and b) that non-woven fabrics retain electrolyte better but have poor mechanical strength, thus resulting in a shorter cycle life, while microporous films have low porosity and do not retain electrolyte well, leading to low capacity.

However, the Appellants have described the advantages and disadvantages of non-woven cloths in the specification in order to show the fact that one skilled in the art would have recognized that non-woven cloths have a serious defective ratio and thus cannot be suitably used alone for lithium secondary batteries. By combining a non-woven cloth and a porous film, the Appellant has succeeded in overcoming the defect of non-woven cloths and exploiting the advantages of non-woven cloths. The Examiner may not pick and choose the information in the specification, but rather, must view the specification as a whole in determining patentability. As such, it appears that the Examiner's interpretation of AAPA, which is the basis of the support for the Examiner's arguments for obviousness finding, is a misinterpretation of the specification.

**Issue 2 - Claims 3 and 4 are allowable over Yamashita in view of Fujiwara and further in view of Shi.**

The Examiner states that Appellants only argue that claims 3 and 4 are dependent on claim 1 but have not argued how the combination is improper. This is incorrect. Applicants have cited case law (*Hartness International Inc. v. Simplimatic Engineering Co.*, 819 F.2d at 1100, 1108 (Fed. Cir. 1987)) to show that because claim 1 is allowable, then claims 3 and 4, which are dependent upon claim 1, are allowable as well.

It is well recognized that if an independent claim is allowable over the cited prior art, then any dependent claims are also allowable because all the limitations of the independent claim are contained in the dependent claims. As such, Appellants respectfully submit that claims 3 and 4 are allowable over the combination of Yamashita, Fujiwara and Shi.

Conclusion

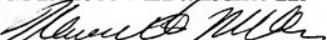
In view of the above arguments and those set forth in the Appeal Brief, Appellant respectfully submits that the Examiner's rejections under 35 U.S.C. § 103 are not legally viable. Appellant, therefore, respectfully solicits the Honorable Board to reverse the Examiner's rejections of claims 1, 2 and 5-8 under 35 U.S.C. § 103(a) for obviousness predicated upon Yamashita et al. (USP No. 6,287,720) in view of Fujiwara et al. (USP No. 6,576,366).

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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